TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	10/038,949
Filing Date	12/31/2001
First Named Inventor	Seyfullah H. Oguz
Art Unit	2613
Examiner Name	Lee, Y. Young
Attorney Docket Number	10830.0079.NPUS00

Total Number of Pages in This Submission **24**

ENCLOSURES *(Check all that apply)*

- [✓] Fee Transmittal Form
  - [ ] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Reply to Missing Parts/ Incomplete Application
  - [ ] Reply to Missing Parts under 37 CFR 1.52 or 1.53

- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
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Remarks

- [ ] After Allowance Communication to TC
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- [ ] Proprietary Information
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Novak Druce & Quigg, LLP.
Signature	*Richard C. Auchterlonie*
Printed name	Richard C. Auchterlonie
Date	18 October 2005	Reg. No.	30,607

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10-19-05

PTO/SB/17 (10-04)
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FEE TRANSMITTAL
for FY 2005
Effective 10/01/2004. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

		Complete if Known
	Application Number	10/038,949
	Filing Date	12/31/2001
	First Named Inventor	Seyfullah H. Oguz
	Examiner Name	Lee, Y. Young
	Art Unit	2613
TOTAL AMOUNT OF PAYMENT ($) 500.	Attorney Docket No.	10830.0079.NPUS00

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☑ Deposit Account:

Deposit Account Number: **05-0889**

Deposit Account Name: **EMC Corporation**

The Director is authorized to: (check all that apply)
☑ Charge fee(s) indicated below ☑ Credit any overpayments
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FEE CALCULATION

1. BASIC FILING FEE

Large Entity		Small Entity			
Fee Code	**Fee ($)**	**Fee Code**	**Fee ($)**	**Fee Description**	**Fee Paid**
1001	790	2001	395	Utility filing fee	
1002	350	2002	175	Design filing fee	
1003	550	2003	275	Plant filing fee	
1004	790	2004	395	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

	Extra Claims		Fee from below	Fee Paid
Total Claims	-20** =	X	=	
Independent Claims	- 3** =	X	=	
Multiple Dependent			=	

Large Entity		Small Entity			
Fee Code	**Fee ($)**	**Fee Code**	**Fee ($)**	**Fee Description**	
1202	18	2202	9	Claims in excess of 20	
1201	88	2201	44	Independent claims in excess of 3	
1203	300	2203	150	Multiple dependent claim, if not paid	
1204	88	2204	44	** Reissue independent claims over original patent	
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent	

SUBTOTAL (2) ($)

*or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity		Small Entity			
Fee Code	**Fee ($)**	**Fee Code**	**Fee ($)**	**Fee Description**	**Fee Paid**
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	430	2252	215	Extension for reply within second month	
1253	980	2253	490	Extension for reply within third month	
1254	1,530	2254	765	Extension for reply within fourth month	
1255	2,080	2255	1,040	Extension for reply within fifth month	
1401	340	2401	170	Notice of Appeal	
1402	340	2402	170	Filing a brief in support of an appeal	500
1403	300	2403	150	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,370	2501	685	Utility issue fee (or reissue)	
1502	490	2502	245	Design issue fee	
1503	660	2503	330	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	790	2809	395	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR 1.129(b))	
1801	790	2801	395	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____
*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 500.

SUBMITTED BY			(Complete *if applicable*)
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

re Application of: Oguz et al.

Serial No.: 10/038,949 Confirm 2180	Group Art Unit: 2613
Filed: 12/31/2001	Examiner: Lee, Y. Young
	Atty. Dkt. No.: 10830.0079.NPUS00
For: Edge Detection Based on Variable- Length Codes of Block Coded Video	

APPEAL BRIEF TO THE BOARD OF PATENT APPEALS AND INTERFERENCES

Commissioner for Patents
PO Box 1450
Alexandria, Virginia 22313-1450

Sir:

Please deduct the $500. fee of 37 C.F.R. 41.20(b)(2) for filing a brief in support of the appeal from EMC Corporation Deposit Account No. 05-0889. A Fee transmittal form is enclosed for this purpose.

I.   REAL PARTY IN INTEREST

The real party in interest is EMC Corporation, by virtue of an assignment recorded at Reel 012469, Frame 0669.

II.   RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF THE CLAIMS

Claims 1-48 have been presented for examination.

Claims 1, 5, 10-12, 16, 20, and 21 have been finally rejected, and are being appealed.

Claims 2-4, 6-9, 13-15, and 17-19 were objected to as being dependent upon a rejected claim.

Claims 22-47 have been cancelled.

IV. STATUS OF AMENDMENTS

No amendment after final rejection has been filed.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The appellants' invention provides very fast and computationally efficient methods of edge detection for block coded video and scene change detection for MPEG video. (Appellants' specification, page 39, lines 11-13.)

The appellants' invention of claim 1 is a method of detecting edges in a compressed video sequence. The compressed video sequence includes at least one frame of block encoded video data. The frame of block encoded video data includes variable-length codes for transform coefficients of blocks of pixels in the compressed video sequence. The transform coefficients include a respective DC coefficient for each of the blocks of pixels. Each respective DC coefficient for at least some of the blocks of pixels is encoded as a respective variable-length code having a length indicating a certain range of differences in DC coefficient values between adjacent ones of the blocks of pixels. The method includes decoding only the length of the

respective variable-length code for the respective DC coefficient for each of at least some of the

blocks of pixels in order to produce an indication of whether or not the compressed video

sequence includes an edge associated with each of the at least some of the blocks of pixels, and

performing a code length threshold comparison upon the length of the respective variable-length

code for the respective DC coefficient for each of the at least some of the blocks of pixels for

producing at least one respective bit indicating whether or not the compressed video sequence

includes an edge associated with said each of the at least some of the blocks of pixels.

(Appellants' specification, page 4, line 19, to page 5, line 12.)

The appellants' invention of claim 12 is a method of detecting edges in a compressed

video sequence. The compressed video sequence includes at least one I-frame of MPEG video

data. The I-frame of MPEG video data includes variable-length codes for DCT coefficients of

8x8 pixel blocks in the image. The DCT coefficients include a respective DC coefficient for

each of the 8x8 pixel blocks. Each respective DC coefficient for at least some of the 8x8 pixel

blocks is encoded as a respective variable-length code having a length indicating a certain range

of differences in DC coefficient values between adjacent ones of the 8x8 pixel blocks. The

method includes decoding only the length of the respective variable-length code for the

respective DC coefficient for each of the at least some of the 8x8 pixel blocks in order to produce

an indication of whether or not the compressed video sequence includes an edge associated with

each of the at least some of the 8x8 pixel blocks, and performing a code length threshold

comparison upon the length of the respective variable-length code for the respective DC

coefficient for each of the at least some of the 8x8 pixel blocks for producing at least one

respective bit indicating whether or not the compressed video sequence includes an edge

associated with each of the at least some of the 8x8 pixel blocks. (Appellants' specification,

page 5, line 13, to page 6, line 6.)

For example, the Appellants' FIG. 3, reproduced below, shows logic for producing a

luminance or chrominance edge signal. If the current block is the first block in the slice, then an

inverter 41 and an AND gate 42 set the edge signal to a logic zero. Otherwise, a decoder 43

decodes the code length of the dct_dc_size_luminance or dct_dc_size_chrominance variable-

length code. A comparator 44 compares the code length to a length threshold to produce the

luminance or chrominance edge signal. The comparator 44 produces a logic 1 when the code

length is equal to or greater than the length threshold. (Appellants' specification, page 17, lines
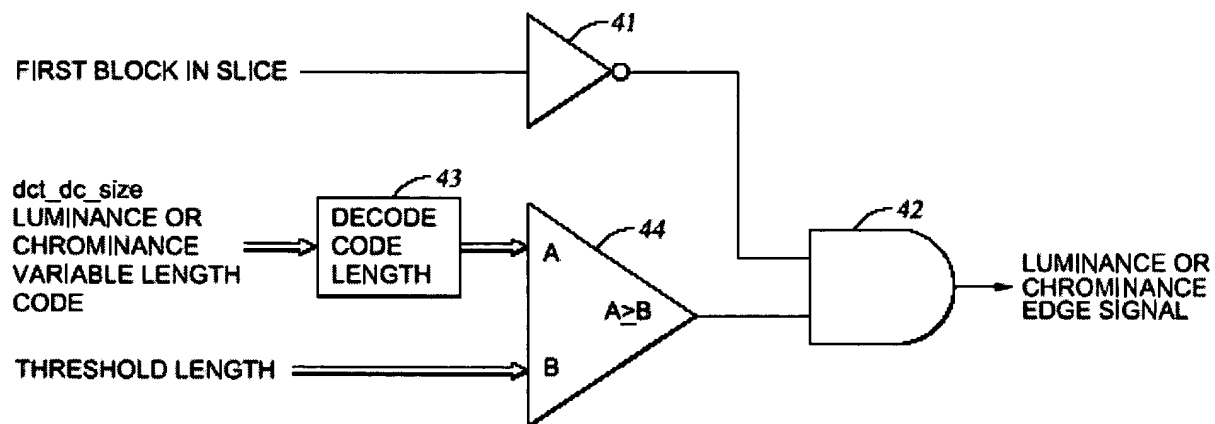
11-17.)

Fig. 3

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Claims 5 and 13 are dependent claims that define using a thinning filter for filtering the respective bits indicating the edges. A thinning filter 21 (FIG. 1) receives edge indications from the edge detector 20, and eliminates some of the less significant edge indications. The thinning filter in effect refines the initial edge information and produces information that can be visualized as edge graph information. (Appellants' specification, page 10, lines 16-21.) The elimination of the less significant edge indications produces a frame of bits that is more representative of the distinctive features of the image. (Appellants' specification, page 15, lines 19-21.) The appellants' FIGS. 6 to 11 show examples of thinning filters, as described in appellants' specification on page 19 line 3 to page 23 line 19.

Claims 10 and 20 are dependent claims that define inspecting a lowest nonzero horizontal frequency transform coefficient and a lowest nonzero vertical transform coefficient for at least one of the blocks of pixels to determine orientation of an edge associated with said at least one of the blocks of pixels. Unless there is a scarcity of computational resources, it is desirable to use information about the gradient or orientation of the edges in order to better distinguish a scene change from change in frames due to some motion of the background or objects in a frame or due to changes in lighting conditions between frames. (Appellants' specification, page 29, lines 20-23.) For example, FIG. 24 shows logic responsive to attributes of only a current block for detecting when within the current block there is (more likely than not) an almost vertical edge with a negative horizontal gradient component and when within the current block there is (more likely than not) an almost vertical edge with a positive horizontal gradient component. (Appellants' specification, page 33, lines 16-20.) FIG. 25 shows logic responsive to attributes

of only a current block for detecting when within the current block there is (more likely than not) an almost horizontal edge with a negative vertical gradient component and when within the current block there is (more likely than not) an almost horizontal edge with a positive vertical gradient component. (Appellants' specification, page 35, lines 19-23.)

Claims 11 and 21 are dependent claims that define using a lowest nonzero horizontal transform coefficient and a lowest nonzero vertical transform coefficient for at least one of the blocks of pixels for computing an approximate gradient vector of an edge associated with said at least one of the blocks of pixels. For example, FIG. 26 is a flow chart of a procedure for estimating the gradient vector of an edge. In a first step 211, the processor decodes an "x" component G_{cx} of the gradient vector for the current block as the value of the lowest AC horizontal frequency DCT coefficient C_{01} for the current block with a sign inversion. In step 212, the processor decodes a "y" component G_{cy} of the gradient vector for the current block as the value of the lowest AC vertical frequency DCT coefficient C_{10} for the current block with a sign inversion. In step 213, the gradient vector of the edge is estimated as $G_{cx}x + G_{cy}y$. (Appellants' specification, page 38, line 23, to page 39, line 10.)

VI.   GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1.   Whether claims 1, 5, 12, and 16 are unpatentable under 35 U.S.C. 102(b) as being anticipated by Mishima et al. U.S. Patent 5,488,418.

2.   Whether claims 10, 11, 20, and 21 are unpatentable under 35 U.S.C. 103(a) over Mishima et al. U.S. Patent 5,488,418 in view of Thomas U.S. Patent 6,801,672.

VII. ARGUMENT

1. **Claims 1, 5, 12, and 16 are patentable under 35 U.S.C. 102(b) and are not anticipated by Mishima et al. U.S. Patent 5,488,418.**

"For a prior art reference to anticipate in terms of 35 U.S.C. § 102, every element of the claimed invention must be identically shown in a single reference." Diversitech Corp. v. Century Steps, Inc., 7 U.S.P.Q.2d 1315, 1317 (Fed. Cir. 1988), quoted in In re Bond, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990) (vacating and remanding Board holding of anticipation; the elements must be arranged in the reference as in the claim under review, although this is not an *ipsis verbis* test).

Claim 1

With respect to the elements of the appellants' claim 1, paragraph 9 on page 4 of the Official Action dated 2/7/05 refers to Mishima et al. Figures 26, 28, 31, 34, 50, and 53, and refers to "decoding only the length 17 of the respective variable-length code for the respective DC coefficient ..." and "a code length threshold comparison 30 upon the length of the respective variable-length code for the respective DC coefficient ..." Reference numerals 17 and 30 are found together in Mishima et al. Figures 31 and 34. Reference numeral 17 is also found in Mishima et al. Figures 26 and 28.

With respect to appellants' claim 1, it is not seen where Mishima discloses the appellants' step of "decoding only the length of the respective variable-length code for the respective DC coefficient for each of said at least some of the blocks of pixels in order to produce an indication of whether or not the compressed video sequence includes an edge associated with said each of said at least some of the blocks of pixels; ..." Reference numeral 17 in Mishima, for example,

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designates a "code length detector" that detects the code lengths of variable-length codes

produced by a code converter 16. However, the code length detector 17 is not shown to receive

the output of the code converter 16; instead, the code converter 16 is shown to receive the same

input signal as the code converter 16. Mishima, col. 10, lines 51-58, indicates that the code

length detector 17 detects the length of the variable-length code simultaneously with the

encoding of the variable length code by the code converter 16. Therefore, the code length

detector 17 does not "decode" the length of any variable-length code.

It is not seen where Mishima discloses the appellants' step of "performing a code length

threshold comparison upon the length of the respective variable-length code for the respective

DC coefficient for said each of said at least some of the blocks of pixels for producing at least

one respective bit indicating whether or not the compressed video sequence includes an edge

associated with said each of said at least some of the blocks of pixels." Reference numeral 30 in

Mishima, for example, designates a threshold comparator, but this threshold comparator is

shown to receive the output of an accumulation adder 19 instead of the output of the code length

detector 17. From the written description in Mishima, it is understood that the output of the

comparator 30 indicates whether an accumulated total of code lengths causes an overflow over

an m-byte boundary or partition used for error-correction encoding. In Mishima FIG. 31 this

condition is detected in order to insert a special code when the overflow occurs so there is no

symbol change during the decoding process. (See Mishima, col. 14, line 64 to col. 15 line 44,

and col. 26 lines 39-43, and Abstract lines 8-11). Therefore, the threshold comparator 30 in

Mishima does not perform a code length threshold comparison upon the length of a variable-

length code of a DC coefficient for producing at least one respective bit indicating whether or not

the compressed video sequence includes an edge associated with a block of pixels.

Moreover, if the comparator 30 in Mishima would compare the threshold C' to the code

length of a variable-length code of a single DC coefficient (rather than an accumulated total of

the code lengths for a series of variable-length codes), the output of the comparator 30 would not

necessarily indicate whether or not the compressed video sequence includes an edge associated

with a block of pixels. The threshold C' is disclosed in Mishima as being set so that the output

of the comparator 30 indicates whether an accumulated total of code lengths causes an overflow

over an m-byte boundary or partition used for error-correction encoding. One would expect that

the threshold C' would be much higher that the maximum code length for a single DC coefficient

so that the partition would be large enough to contain at least the code for one DC coefficient.

There would be a serious performance problem if the code length of a single DC coefficient

would cause overflow over the partition used for error correction. (E.g., the process of moving

the variable-length code from one partition to the next, as described in Mishima col. 15, lines 34

to 37, would be inoperative because the variable-length code would never all fit in the next

partition.) If the threshold C' is set higher than the maximum code length for the DC coefficient

and the comparator would compare the threshold C' to the code length of a variable-length code

of a single DC coefficient, then the output of the comparator 30 would not indicate whether or

not the compressed video sequence includes an edge associated with a block of pixels.

With respect to the Examiner's Response to Arguments on pages 3 to 4 of the Final

Official Action dated May 20, 2005, the appellants respectfully point out that the Examiner

must not only make requisite findings, based on the evidence of record, but must explain the

reasoning by which the findings are deemed to support the asserted rejection. See In re Lee, 277

F.3d 1338, 1343, 61 U.S.P.Q. 2d, 1430, 1433-34 (Fed. Cir. 2002). For example, in response to

the appellants' argument that element 17 of Mishima et al does not "decode", paragraph 8 on

page 3 of the Final Official Action says: "However, Examiner does not rely on element 17 to

teach such capability because the decoding process is already disclosed in Figure 22. Element 17

merely illustrates the concept of such common detection of the length of variable-length code."

Without reliance on element 17 of Mishima et al., the Examiner has not identified

anything else that possibly may be performing appellant's claimed step of "decoding only the

length of the respective variable-length code for the respective DC coefficient for each of said at

least some of the blocks of pixels in order to produce an indication of whether or not the

compressed video sequence includes an edge associated with said each of said at least some of

the blocks of pixels ...". It is not seen where that the decoding process of Figure 22 of Mishima

et al. is decoding "in order to produce an indication of whether or not the compressed video

sequence includes an edge associated with said each of said at least some of the blocks of

pixels..." It is not seen where "an indication of whether or not the compressed video sequence

includes an edge ..." is produced by "decoding only the length ..." Nor is the decoding process

of Figure 22 of Mishima et al. arranged with the comparator 30 in Mishima et al. or anything

performing a code length threshold comparison upon the length of the respective variable-length

code for the respective DC coefficient" as further recited in appellants' claim 1. In other words,

the Examiner has the burden to not only identify things or processes in Mishima et al. that

perform the two operations of the respective two paragraphs of appellants' claim 1 but also must show that such things or processes are arranged in Mishima as they are recited in appellants' claim 1. See In re Bond, supra.

Paragraph 9 on page 3 of the Final Official Action suggests that a threshold comparator receiving the output of the code length detector is not recited in the rejected claims. Appellants' claim 1, however, recites "decoding only the length of the respective variable-length code ..." and "performing a code length threshold comparison upon the length of the respective variable-length code .." The burden of showing that elements are arranged in the reference as in the claim under review cannot be avoided because the claimed elements cannot be specifically identified in the reference. It is the Examiner's burden to show that Mishima performs a code length threshold comparison upon the length of the respective variable-length code.

Paragraph 10 on page 4 of the Final Official Action suggests that the specifics of Mishima's comparator 30 are not pertinent to the applicants' claim language. However, it is the Examiner's burden to show that Mishima discloses a "code length threshold comparison ... for producing at least one respective bit indicating whether or not the compressed video sequence includes an edge associated with said each of said at least some of the blocks of pixels."

Claim 5

With reference to the appellants' claim 5, Mishima et al. discloses the use of filters 81, 82, 83, and 84, which Mishima says are band-division and thinning filters. (Mishima, column 25, lines 34-55.) However, these filters 81, 82, 83, 84 are understood to be filtering the blocked

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video signal in order to extract low or high frequency band signals in respective horizontal and vertical directions. It is not seen where Mishima discloses that these filters are filtering "the respective bits indicating whether or not the compressed video sequence includes an edge associated with each of said at least some of the blocks of pixels," i.e., the bits that are output from a threshold comparator, as recited in claim 1. In reply to paragraph 11 on page 4 of the Final Official Action, these respective bits are not simply any bits in the processing of a digital video sequence.

Claim 12

The appellants' claim 12 is distinguished from Mishima for the same reasons given above with respect to appellants' claim 1.

Claim 16

The appellants' claim 16 is distinguished from Mishima for the same reasons given above with respect to appellants' claim 5.

2.   Claims   10, 11, 20, and 21 are patentable under 35 U.S.C. 103(a) over Mishima et al. U.S. Patent 5,488,418 in view of Thomas U.S. Patent 6,801,672.

The policy of the Patent and Trademark Office has been to follow in each and every case the standard of patentability enunciated by the Supreme Court in Graham v. John Deere Co., 148 U.S.P.Q. 459 (1966). M.P.E.P. § 2141. As stated by the Supreme Court:

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.

148 U.S.P.Q. at 467.

The problem that the inventor is trying to solve must be considered in determining whether or not the invention would have been obvious. The invention as a whole embraces the structure, properties and problems it solves. In re Wright, 848 F.2d 1216, 1219, 6 U.S.P.Q.2d 1959, 1961 (Fed. Cir. 1988).

Mishima et al. relates to encoders for encoding a video signal used in television or the like, and to a decoder for decoding encoded data which is recorded on a recording medium. (Col. 1, lines 4-7.) An encoder counts the length of data produced by variable-length encoding, and time-division multiplexes information of the data length to the variable-length encoded data. An encoder time-division multiplexes information of the number of bits after a fixed partition used in the error-correction encoding to the initial bit of a variable-length code to a variable-length encoded data, and transmits them. An encoder is also described which, when a variable-length code for one symbol of the variable-length encoding extends over a partition used in the error-correction encoding, inserts a special code before the partition, or guarantees that the top of the partition is always at the top of the variable-length code. An encoder is also described which obtains the sum of fields and the

difference between fields, and performs on these values the orthogonal transform to encode them. (Mishima et al., Abstract.)

Pertinent portions of Mishima et al, and differences between Mishima et al. and the subject matter of the appellants' independent base claims 1 and 12, are discussed above with reference to the rejection of claim 1.

Thomas relates generally to digital image processing, and more particularly to a system and method for removing noise from color images using wavelets. (Thomas, col. 1, lines 6-8.) A wavelet transform is applied to a color image to generate sets of wavelet transform coefficients for multiple channels. Edge maps are produced for the channels from the sets of wavelet transform coefficients. An edge likelihood map is generated based on at least one edge map. The edge likelihood map is applied to the sets of wavelet transform coefficients to generate sets of filtered wavelet transform coefficients. A de-noised color image is reconstructed from the sets of filtered wavelet transform coefficients. (Thomas, abstract.)

The Official Action dated 2/7/05 cited Thomas for a teaching of an inspection method with reference to Thomas Figures 2 and 8 to determine orientation of edge for computing an approximate gradient vector of an edge associated with at least one of the pixel blocks. The Official Action concludes that a person of ordinary skill in the art, having both the references of Mishima et al and Thomas before him/her, to exploit the well known gradient vector computational technique as taught by Thomas in the edge detection method of Mishima et al. in order to provide a fast and computationally efficient method of edge detection for block coded video and scene change detection for MPEG video. Appellants respectfully disagree. As set out

above with reference to claim 1, Mishima lacks a disclosure of the two steps recited in the base claims 1 and 12. Thomas fails to supply these missing elements, which under 35 U.S.C. 112 paragraph 4, are incorporated by reference into appellants' claims 10, 11, 20, and 21.

Furthermore, if a person of ordinary skill were given both the references of Mishima et al. and Thomas and told to combine them to perform edge detection for block coded video and scene change detection for MPEG coded video, the person of ordinary skill would not be motivated to practice the appellants' claimed method. Instead, the person of ordinary skill would practice a substantially different method. Thomas teaches that one can compute wavelets that are partial derivatives of smoothed versions of the input signal, and that can be combined to form gradient vectors that can be used to locate edges at a particular scale. (Thomas, col. 6, line 34 to col. 7, lines 14.) Edges are located at points where the modulus (magnitude) of the gradient vector is maximum along a line pointing in the direction of the gradient. Spatially sampled version of the edge gradient modulus (magnitude) and angle are determined from the resulting wavelet coefficients, for each corresponding pixel location, as set out in the equations in Thomas, col. 8, lines 15-40. This edge detection method of Thomas is substantially different from the edge detection methods of appellants' claims 1 and 12.

If a person of ordinary skill were given Mishima and told to use the method of Thomas in Mishima for edge and scene change detection, the person of ordinary skill would have looked for "edge" and "scene change" in Mishima, and would have found "edge" and "scene change" with reference to Mishima's "Thirteenth Embodiment" in Mishima column 23 line 65 to Mishima column 24 line 47. There, Mishima says: "According to the specific embodiment, for example,

in the anticipation of the generated code amount, a case where an edge and a transient coexist in the block may be detected, and the combination of an HPF and LPF enables the judgment to be done." So a person of ordinary skill, trying to do this, might use the method of Thomas in the generated code amount anticipating /comparing unit 71 so that the output of the field sum/difference blocking circuit is not selected when an edge and a transient coexist in a block. However, the combination of an HPF and LPF, and the Thomas' edge detection method, are each substantially different from and considerably more complex that the appellants' method of claim 1 and claim 12. For example, neither the encoder in Mishima FIG. 50(a) nor the edge detection method of Thomas appears to use a code length decoder or a code length threshold comparator. The edge detection method of Thomas appears to be entirely satisfactory for its intended purpose of generating an edge map or detecting the presence of an edge in a block. Therefore, it is not seen how the appellants' method would have been suggested by or would have resulted from the disclosure in Thomas, either alone or in combination with Mishima.

In reply to paragraph 12 on page 4 of the Final Official Action, appellants respectfully submit that the cited references themselves do not provide sufficient motivation for a combination and modification of Mishima et al. and Thomas that would be required to arrive at appellants' claimed invention. Given the "subtle but powerful attraction of a hindsight-based obviousness analysis," the Federal Circuit requires a "rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references." In re Dembiczak, 175 F.3d 994, 999, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999). See also In re Lee, 277 F.3d 1338, 1344 (Fed. Cir. 2002).
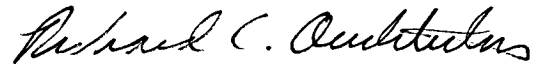
Hindsight reconstruction, using the applicant's specification itself as a guide, is improper because it fails to consider the subject matter of the invention "as a whole" and fails to consider the invention as of the date at which the invention was made. The critical inquiry is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. In re Dembiczak, 175 F.3d 994, 999-1000, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999)(actual evidence and particular findings need to support the PTO's obviousness conclusion); Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1138, 227 U.S.P.Q. 543, 547 (Fed. Cir. 1985) ("The invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time."); In re Fritch, 972 F.2d 1260, 1266, 23 U.S.P.Q.2d 1780, 1784 (Fed. Cir. 1992)("It is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious."); Fromson v. Advance Offset Plate, Inc., 755 F.2d 1549, 1556, 225 U.S.P.Q. 26, 31 (Fed. Cir. 1985) (nothing of record plainly indicated that it would have been obvious to combine previously separate lithography steps into one process). See, for example, In re Gordon et al., 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984) (mere fact that prior art could be modified by turning apparatus upside down does not make modification obvious unless prior art suggests desirability of modification); Ex Parte Kaiser, 194 U.S.P.Q. 47, 48 (PTO Bd. of Appeals 1975) (Examiner's failure to indicate anywhere in the record his reason for finding alteration of reference to be obvious militates against rejection).

In view of the above, the rejection of claims 1, 5, 10-12, 16, 20, and 21 should be reversed.

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VIII. CLAIMS APPENDIX

The claims involved in this appeal are as follows:

1.   A method of detecting edges in a compressed video sequence, the compressed video sequence including at least one frame of block encoded video data, the frame of block encoded video data including variable-length codes for transform coefficients of blocks of pixels in the compressed video sequence, the transform coefficients including a respective DC coefficient for each of the blocks of pixels, each respective DC coefficient for at least some of the blocks of pixels being encoded as a respective variable-length code having a length indicating a certain range of differences in DC coefficient values between adjacent ones of the blocks of pixels, wherein the method comprises:

decoding only the length of the respective variable-length code for the respective DC coefficient for each of said at least some of the blocks of pixels in order to produce an indication of whether or not the compressed video sequence includes an edge associated with said each of said at least some of the blocks of pixels; and

performing a code length threshold comparison upon the length of the respective variable-length code for the respective DC coefficient for said each of said at least some of the blocks of pixels for producing at least one respective bit indicating whether or not the compressed video sequence includes an edge associated with said each of said at least some of the blocks of pixels.

5.   The method as claimed in claim 1, which includes using a thinning filter for filtering the respective bits indicating whether or not the compressed video sequence includes an edge associated with each of said at least some of the blocks of pixels.

10.   The method as claimed in claim 1, wherein the transform coefficients include respective horizontal frequency transform coefficients and respective vertical frequency transform coefficients for each block of pixels, and the method includes inspecting a lowest nonzero horizontal frequency transform coefficient and a lowest nonzero vertical frequency transform coefficient for at least one of the blocks of pixels to determine orientation of an edge associated with said at least one of the blocks of pixels.

11.   The method as claimed in claim 1, wherein the transform coefficients include respective horizontal frequency transform coefficients and respective vertical frequency transform coefficients for each block of pixels, and the method includes using a lowest nonzero horizontal frequency transform coefficient and a lowest nonzero vertical frequency transform coefficient for at least one of the blocks of pixels for computing an approximate gradient vector of an edge associated with said at least one of the blocks of pixels.

12. A method of detecting edges in a compressed video sequence, the compressed video sequence including at least one I-frame of MPEG video data, the I-frame of MPEG video data including variable-length codes for DCT coefficients of 8x8 pixel blocks in the compressed video sequence, the DCT coefficients including a respective DC coefficient for each of the 8x8 pixel blocks, each respective DC coefficient for at least some of the 8x8 pixel blocks being encoded as a respective variable-length code having a length indicating a certain range of differences in DC coefficient values between adjacent ones of the 8x8 pixel blocks, wherein the method comprises:

decoding only the length of the respective variable-length code for the respective DC coefficient for each of said at least some of the 8x8 pixel blocks in order to produce an indication of whether or not the compressed video sequence includes an edge associated with said each of said at least some of the 8x8 pixel blocks; and

performing a code length threshold comparison upon the length of the respective variable-length code for the respective DC coefficient for said each of said at least some of the 8x8 pixel blocks for producing at least one respective bit indicating whether or not the compressed video sequence includes an edge associated with said each of said at least some of the 8x8 pixel blocks.

16.   The method as claimed in claim 12, which includes using a thinning filter for filtering the respective bits indicating whether or not the compressed video sequence includes an edge associated with each of said at least some of the 8x8 pixel blocks.

20.   The method as claimed in claim 12, wherein the DCT coefficients include respective horizontal frequency DCT coefficients and respective vertical frequency DCT coefficients for each of the 8x8 pixel blocks, and the method includes inspecting a lowest nonzero horizontal frequency DCT coefficient and a lowest nonzero vertical frequency DCT coefficient for at least one of the 8x8 pixel blocks to determine orientation of an edge associated with said at least one of the 8x8 pixel blocks.

21.   The method as claimed in claim 12, wherein the DCT coefficients include respective horizontal frequency DCT coefficients and respective vertical frequency DCT coefficients for each of the 8x8 pixel blocks, and the method includes using a lowest nonzero horizontal frequency DCT coefficient and a lowest nonzero vertical frequency DCT coefficient for at least one of the 8x8 pixel blocks for computing an approximate gradient vector of an edge associated with said at least one of the 8x8 pixel blocks.